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ABSTRACT

It is part of the task of teacher educators to make the invisible part of teaching visible to teacher education candidates. During class discussions and in written assignments, pre-service teachers often talk about meeting the needs of all students. This dedication to teaching to all students appears to falter when confronted with activities that push the pre-service teachers to take ownership of situations and propose alternative actions, or when they are faced with teaching in diverse classrooms. This paper describes methods of helping pre-service teachers develop action plans for addressing student needs in regards to learning styles, gender, and cultural diversity. (CCM)

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Developing Actions Plans for At-Risk or Marginalized Students

by

Marcia K. Fetters

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DEVELOPING ACTION PLANS FOR AT-RISK OR MARGINALIZED STUDENTS

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It is part of our task as teacher educators to make the invisible parts of teaching visible to our teacher education candidates. During class discussions and in written assignments pre-service teaches will often talk quite eloquently about meeting the needs of *all* students. This dedication to teaching *all* students appears to falter when confronted with activities that push the pre-service teachers to take ownership of situations and propose alternative actions, or when they are faced with teaching in diverse classrooms.

Education courses for general education teachers, including methods courses, often provide prospective teachers with some general characteristics of children with handicaps or students from different backgrounds. Special education courses often focus on student limitations rather than potential. This summary of characteristics without consideration for effective teaching strategies can intensify hidden stereotypes and prejudices (Kozal, 1991). Beyond experience with literature, or work with case studies that address issues faced in science classes by students with learning disabilities or physical limitations, prospective science teachers need field experiences with cooperating teachers who are known for their skill in helping each student reach their potential (American Association for the Advancement of Science, 1998). Minimal time in special education teacher education programs is devoted to science education, leaving special education teachers under

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prepared to teach science in resources rooms or to work with a science teacher (Lucas-Fusco, 1993). Science classes that are well structured and activity based are well suited to students with learning disabilities (Choate, 1994). Science methods textbooks often have short sections that describe various learning styles. Some authors prompt pre-service teachers to examine their expectations and how these expectations influence instructional behavior (Baker & Piburn, 1997). This is a great start, and raises the issues that teachers must address, but it often neglects to provide them with an adequate set of tools that they can use. Beginning science teachers need specific strategies and plans for meeting the needs of these students.

One of the major differences between a beginning teacher and a master teacher is that on a day when nothing seems to be going right the beginning teacher may get flustered and frustrated then start blaming the students for their inability to learn, or the district/state for having an unreasonable curriculum. Given the same set of conditions a Master teacher often switches to "Plan B" and sometimes, if circumstances dictate, to plans C, D, and E before getting frustrated or flustered. Having these backup plans and alternative approaches (both thought out and available) is one of the main differences between a novice teacher and an experienced or effective teacher. Novice teachers may be aware of the wide variety of resources available to them through their methods classes and through professional journals (Wielert & Sheldon, 1984), (Scruggs & Mastropieiri, 1994). Internet resources and articles are readily available and accessible. Awareness of options is not the biggest stumbling block that pre-service teachers face. The struggle comes in

the personalization and implementation of strategies that make science accessible. Pushing preservice teachers to develop action plans for doing this is one strategy for helping preservice students make the transition from student to teacher.

The *National Science Education Standards* (National Research Council, 1996) describe six primary science-teaching standards. Three of these standards can be directly tied to the need to meet the needs of all students in a class and the need for a pro-active stance in addressing student needs. These standards are quoted below with annotations (*in italics*) of correlations to marginalized or at-risk students added by this author.

Teaching Standard A:

Teachers of science plan an inquiry-based science program for their students. In doing this, teachers

- Develop a framework of yearlong and short-term goals for students. *In special education terms these are called Individualized Program Plans (IEP's).*
- Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, and experiences of students. *Modifications and adaptations planned for students.*
- Select teaching and assessment strategies that support the development of student understanding and nurture a community of science learners. *Focus on what students can do, and their potential not their weaknesses.*

- Work together as colleagues within and across disciplines and grade levels. *As a science department and individual work with special education teachers and other support specialists.* (page 30)

Teaching Standard C:

Teachers of science engage in ongoing assessment of their teaching and of student learning. In doing this, teachers

- Use multiple methods and systematically gather data about student understanding and ability. *Working with special education teachers, consultants and parents to find out about students and best ways of supporting students.*
- Analyze assessment data to guide teaching. *Don't just get information, use it and modify or adapt instruction or locate support resources based on information.*
- Guide students in self-assessment. *Help students be proactive in requesting support.*
- Use student data, observations of teaching, and interactions with colleagues to report student achievement and opportunities to learn to students, teachers, parents, policy makes, and the general public. *Focus on successes and benefits of inclusion, not just the dilemmas.* (page 38)

Teaching Standard D:

Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science. In doing this, teachers

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- Structure the time available so that students are able to engage in extended investigations. *Arrange ample time for all students to engage in investigation.*
- Create a setting for student work that is flexible and supportive of science inquiry. *Work surfaces at multiple levels and accessible to all students.*
- Ensure a safe working environment. *Does not equal have some student excluded from lab activities, but making modifications and plans so that lab is a safe environment.*
- Make the available science tools, media, and technological resources accessible to students. *Identify and ask for support in obtaining adaptive technology (audible thermometers, Braille texts, voice-activated tools, etc.)*
- Identify and use resources outside the school. *Find out what is readily available in community for short or long term loan.*
- Engage students in designing the learning environment. *Seek student input on what they need and how the classroom can be modified to best meet their needs.* (page 43)

What is an "Action Plan"?

Action plans, as described in this paper, are these backup plans or alternative strategies written up and formalized by pre-service or novice teachers. Under the stress of the moment it is difficult for novice teachers to be able to brainstorm their options in a given situation. It is hard to keep in focus the needs of all students in a class. It becomes easy to blame students for their inability to understand and move forward. The goal of developing action plans is to help pre-service

teachers move from being reactive to classroom events to proactive managers or facilitators in their classrooms. Students in this study developed action plans for addressing student needs in regards to: learning styles, gender, and cultural diversity. An action plan for classroom management is also assigned during field experiences and during student teaching/internship.

Developing action plans and presenting them to peers, cooperating teachers and faculty members can help refine these plans and develop ownership of these plans. As science educators we often ask preservice teachers to develop lesson plans and units. We do this and make it a course requirement because we know they can modify and use these plans and units in the future. Action plans represent a next step in supporting pre-service teachers prepare for their own classrooms, lesson plans and units help teachers think about issues of content and pedagogy. Action plans help them address what are often called the "invisible parts of teaching" those decisions that an experienced teacher makes on a minute by minute basis and that are woven into instruction but not always obvious to an observer or to their students. Action plans are a proactive step to address some of those issues that can place students at-risk of not being successful in science classes.

There are a few general characteristics that all action plans assigned by this author share. Specifics and framing will vary from assignment to assignment depending on the focus. The following can be used as a starting template for developing these types of assignments:

a)Description of situation or rationale for need for action; b) Background information (if available); c) Identification of individuals involved.; d) Identification of available resources; e) Identification of

3-5 options.; f) Prioritization of options; g)Follow-up plans. As well as having students develop action plans that are assigned in the methods courses or during field experience it is hoped that students will take this strategy and continue to use it, possibly in less formal ways, through out their careers.

When the assignment is given and described to pre-service teachers a brief statement for the description of the situation or a sample rationale for the need for action is provided and has usually been part of the discussion for one or more class periods and students are expected to expand this to 2-3 paragraphs. A limited amount of information to get students started is provided about background information and available resources during course work and in readings. It is expected that students will talk with cooperating teachers and do some additional research prior to submitting their plans. For most action plans students are asked to bring 5 copies to class on the assigned day; one for the instructor; one for themselves and one for each of the members of their small working groups. On that day students spend a few minutes describing their plans to their peers in their group and are responsible for responding in writing to their peers plans one week later. Using this feedback and feedback from the instructor students then has one week to revise their plans. Directions given to the student for writing their action plans can be found in Appendix A. Sample action plans can be found in Appendix B. A sample rubric for grading an action plan can be found in Appendix C. These action plans, a teaching philosophy, resume, sample lessons and a unit they

have developed become the beginning of their teaching portfolio which is evaluated at the conclusion of the student teaching/internship experience.

The Barriers to Developing Action Plans

In the beginning students resist doing these action plans. Time, patience and a great deal of discussion are required to help pre-service teachers clearly understand the purposes behind them, and see them as worthwhile and doable assignments. To set this up as a wonderful, exciting thing to have pre-service teachers work on would set anyone who tries this with their pre-service teachers up for frustration. The end products are worth the struggle, but classroom climate can become tense, especially during the development of the first action plan. There are some major barriers that make these types of assignments difficult for pre-service teachers. Most of these barriers are not ones that are easily or quickly addressed since they are issues of identity and role, and are often based in prior experiences or the lack of prior experience. It is one thing to say that your classroom is going to be a place where all students can and will succeed and learn, and quite another thing to make specific plans for making this goal a reality. Students will not always be able to articulate why this assignment is difficult. Providing examples or templates is helpful, brainstorming time in class and in small groups also can be helpful.

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Reactive skills versus proactive skills

It is common to hear pre-service teacher start a discussion or their remarks with statements such as: "If teachers only..."; "Teacher should..."; "Teachers don't..."; "Why don't teachers just.". There seems to be little recognition in these statements that in a very short time they are about to become the teachers who they are making statements about or whom they are critiquing. In our education classes we often ask pre-service teachers to view classroom videotape or to do field experiences in schools where they analyze what is happening in the classes. The students analyze these situations in regards to topics such as: classroom management; issues around gender; multicultural perspectives; questioning patterns; assessment strategies; cooperative learning activities; content and pedagogy. So it is not surprising that as they enter methods classes they have skill in analyzing a classroom setting. Pre-service teachers often though become frustrated and feel threatened when asked or pushed to move past analysis of the situation and make recommendations for what could be done differently or subsequent to the episode observed. Preservice teachers are often quick to judge a situation as "good teaching" or "weak teaching"; they have less experience in thinking about what could or should be done differently.

Technician versus Professional

Pre-service teachers often get frustrated with education courses because they see them as hoops they must jump through, but they rarely see the relevance they have for the classroom. It is common for science methods students when asked what they hope to get from the course to write

down things such as: setting up labs, making up chemical solutions, using equipment and discipline. They want to believe that there is a magic procedure out there for teaching that if they know the procedure and follow it they will be successful.

Lack of Experience

Most people enter teacher education courses feeling that they already know a great deal about teaching. After all they have been students for years. Handing students a yo-yo or other simple toy the first day of class and asking them to describe how and why it works the way it does can help student realize that familiarity with an object or process doesn't necessarily equal understanding or mastery. Most education programs try to provide pre-service teachers with a wide range of field experiences. These experiences are designed to help the student start to look at teaching from a teacher perspective instead of a student perspective. Depending on the placement, the assignment and their role during these field experiences though students may not gain the experiences needed to be able to brainstorm options and make plans.

Site Specific

The action plans shared at the end of this paper are ones that are geared toward learning styles, gender and diversity issues. Students are expected to develop two additional action plans during their methods course that are implemented and tested for effectiveness during student teaching or internship these action plans are: A classroom management plan and a professional development plan. A general plan can be developed in isolation of the school, but each school has a

policy for inclusion or mainstreaming. Each school has a discipline code and set of procedures for disciplinary action and parent contact. Some students plan on returning to teach in rural settings and schools that are culturally very homogenous and are resistant to struggling with issues of diversity. Some pre-service teachers doubt the impact of socioeconomic status and are resistant to the need to address these issues. Through out our education programs we talk about the individuality of students, schools and communities and the need to take this into consideration when planning. Knowing this, novice teachers are hesitant to develop detailed plans without knowing the specifics of the setting. Pre-service teachers will often question the necessity of developing a plan prior to needing a plan and prior to getting to know their school. This concern disappears when they encounter situations where they can implement their plans.

Ownership and empowerment: "The teacher emerges"

Several years ago a pre-service teacher in a large metropolitan city in the southeast described to this author how he was moving from a student perspective to a teacher perspective. He was describing a tutoring experience where in the midst of working with the student he all of a sudden felt like a teacher. The young man he was working with was really struggling with understanding electricity. The diagrams in the book just didn't make sense and he felt lost in class, so he came to the after school tutoring sessions to get some help.

This experience was toward the end of his teacher education program and in the semester just prior to student teaching. He titled his journal entry "The teacher emerges." He was able to put into

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words what many of his peers were struggling to communicate in a variety of ways. Teaching and his role as teacher had become real to him, and he recognized that whether the student mastered the material or not rested primarily with him. How he structured and presented the material, the use of multiple-examples, and teaching strategies had a major impact on what kind of learning happened. Many pre-service teachers think that the successful completion of education courses will make them teachers. The successful completion of high school had made them college students. So it is natural that they might have the sense that if they complete their university courses they will become teachers. It is hard for students to understand that the completion of course work alone is not sufficient for becoming an effective teacher.

In most institutions specific content methods courses are taught just prior to student teaching. This provides an opportunity for students to think about and plan for what they will do when it is their class. Student teachers and interns make the transition from student to teacher but are still not anxious to take complete responsibility for the classroom or for student learning. When questioned about why they choose a certain content or way of organizing a lesson they will often defend their teaching choices or teaching style. They will say things such as: "If this were really my class I would... but I don't think my cooperating teacher would let me do that, and this is their class." Observations in first year teacher classrooms often show that the intents and goals they describe for their classrooms during pre-service education courses are not always translated into practice when they begin their teaching careers. Some authors make the claim that this happens because teachers

lack the tools or skills needed to implement these changes. They know they want things to be different but they do not have a specific plan for how to do this.

Student Reactions and Feedback

As mentioned in the previous section, developing action plans rarely rates high on the fun or enjoyable list for pre-service teachers. Finding lessons or resources on the internet, teaching mini-lessons to their peers, field experiences and other course activities often rate much higher in preference. Across the year of methods and student teaching/internship, students' views about action plans usually undergo subtle changes. At the conclusion of student teaching they still may not like writing them, but most recognize their benefit. Some dynamics of students' reactions to action plans are presented below:

Confusion

When action plans are initially presented and described, students have a hard time understanding what an action plan is and why they would want to do one. They have worked in classrooms--they know that teachers don't write down action plans. They think that teachers make the decisions and structure the content intuitively. They are used to writing down or documenting what has happened in a classroom with an analysis of the situation. They have some recognition of the role of lesson plans and the need for them, but action plans often address contextual issues and they are not sure why they should write them or what they should include.

Resistance

Initial reaction is similar to the one they have when we talk about the importance of lesson plans. When they visit schools and talk to teachers about planning teachers often show them of book divided into 5 blocks and this makes up their lesson plans. When we ask students to identify rationale, objectives, materials, content outline, and assessment they and (sometimes) their cooperating teachers think they the university requires too much. In the crunch times of the semester this assignment is often viewed as an unnecessary burden.

Frustration

Once they start working on the assignment, frustration often sets in. In class they will often question: How can we do this if we don't know our classes or where our school is? The topics for action plans are ones that students have explored in multiple classes, but personalizing the information and shifting knowledge to actions is a frustrating and difficult process. Most students seek the advice of their cooperating teachers. When it comes time to share them and get feedback from peers, the list of strategies and possibilities expands and the assignment seems more manageable. It is usually the initial time they start trying to write down something that frustration is at it's highest.

Overwhelmed but optimistic

After the first action plan, most students feel like they could write one for most topics, given time to do the research. During either their methods field experience or during their student

teaching/internship most pre-service teachers will try out some part of their action plan. This is when they find out if what they have proposed will work for them and with this group of students. Complete success is rare, but they usually find it fairly easy to modify and move forward. Often action plans will reflect their cooperating teachers or they represent and idealized view of schools and students. These action plans can be difficult for pre-service teachers to implement. A specific plan may not match their personality and they can't sustain it, or the complexity of the school setting is not addressed in the plan.

Even if students have limited success with their action plans by the end of student teaching/internship they see merit in having at least thought through the options. Some students take the activity to extremes and try to draft action plans for a wide variety of topics. Sometime toward the end of the methods semester or during student teaching/internship it usually starts to hit pre-service teachers about how much work and planning goes into teaching and they start to get overwhelmed. Action plans can help reduce this panic.

Instructional Issues/Concerns

Just as there are a set of concerns and range of emotions about this assignment from the students each semester, there are a series of concerns for the instructor. Most of the questions are around what topics to assign for action plans, balancing the number of action plans with other course expectations, and issues of framing the assignment and assessment. Each semester the assignment

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has been given slight modifications have been made in an attempt to better meet the needs of the future teachers.

Readiness issues

Pacing and timing when to assign these action plans is always problematic. Field experiences can vary greatly between students and between classes. Pre-service teachers must have started that transition from student to teacher for this assignment to make any sense. They also need a strong relationship with their cooperating teachers and/or peers to have the trust to ask for help and to take feedback as constructive and not critical.

Expectations

How detailed should these plans be is always a top question for students and a major concern for the instructor. Earlier versions of this assignment had the action plans as being a bulleted list of 8 to 10 strategies or resources that could be used and a sentence or two at the top identifying the topic. This was clear and most students found the task fairly easy. Most students started listing 8 to 10 web sites with related information. This makes a good resource list, but it was difficult for students to implement during their field experiences. There was little resistance to this assignment but also little ownership or personalization of the issue. As additional things were added to the action plan, initial resistance to the assignment has grown, but satisfaction and use of the action plans during student teaching/internship has also grown.

Evaluation

The focus on making action plans personal dictates that a rubric for assessment has to be structured to reward individuality. For an action plan to work for a teacher it must tap into the teacher's strengths and teaching styles. One plan will not work for all teachers. The plan also needs to be modified as experience is gained and with the changing student population. Some teachers will find something that works great most of the time and may not need multiple back-up plans. Some teachers are naturally aware of students who are struggling and make accommodations for them in what appears to be a seamless way. They often don't even realize that they are making these accommodations. Pointing these strategies out to them in the field can help them become more aware of what they are doing and encourages them to continue to support students. Other teachers will struggle with any student who does not share their own learning style, or can become frustrated with the student who may need additional time or the content structured in a multiple ways. For these teachers, having a plan in place to refer to can be very beneficial. Pre-service teachers will vary greatly along the continuum. Each semester, formalizing a rubric that is defensible is a challenge. A draft rubric is included in the appendix.

Another issue in assessment is the balance between evaluating the action plans individually and evaluating them as part of a teaching portfolio. The action plans are assigned individually but together with other resources becomes part of a teaching portfolio. It is the beginning of the type of documentation they will need to keep as entry year teachers, for continued certification and for

national board certification. As part of a portfolio, there should be consistency between them. Since action plans are often written at different parts of the semester and year, what should be the expectation at the conclusion of student teaching/internship? Where should energy be devoted during those last weeks of teacher education program?

Future plans and goals

The use and potential of this type of assignment is something that this author continues to work on and struggle with. Feedback from pre-service teachers, cooperating teachers and administrators where these pre-service teachers take jobs has been positive. All agree that the topics of these action plans are issues that teachers need to wrestle with before they start teaching. Action plans represent one product of these reflections, even while the form for framing, explaining and having teachers formalize these action plans is under continual revision. It is unclear what other products might help foster this reflective, responsive and proactive stance toward at-risk students. One option under consideration is student interviews. Another option is working with a special education teacher as they develop a student's Individualized Education Program (IEP).

The concern with adding additional assignments in this area is the resultant need to then drop or minimize other topics in the science methods course. It is the continued struggle of time and energy. If something gets added something else must come out to meet the constraints of time and resources.

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Appendix A. - Directions for Assignments

A complete example of the assignment is provided for learning styles. For all other actions plans the beginning prompt only is provided.

Action Plan -- Learning Styles

As science teachers we have a responsibility to teach all students. Each classroom will have students with a wide range of learning styles and abilities. How are you going to ensure that you are meeting the needs of your students? What resources are available to help you support students? "Learning Styles" is a huge category and can mean many different things to different people. To limit the focus of this action plan choose one of the following categories and address three areas in each of this categories.

A. Learning Disabilities (dyslexia, attention deficient disorder, etc.)
B. Physical Limitations (hearing, visually, or mobility impaired, etc.)
C. Gardner's 7 Intelligences
D. Your proposed category (Check with me about additional categories or interests that you have that might fall under learning styles.)

Use the following to guide your development of an action plan. This is not meant to be the way that you present your plan. Several of these items could be grouped together. How you develop your plan and present it is a personal decision, but these are the items that you will be evaluated on (see grading rubric).

- Description of situation or rationale for need for action. (Minimum of 2-3 paragraphs)
- Background information (Are there appropriate laws, regulations mandating support? Is the school or another agency providing support? Is there a school focus or school support for this area?)
- Identification of individuals involved. (Detail who is involved and what responsibility each individual has)
- Identification of available resources.
- Identification of 3-5 options for each area.
- Prioritization of options (which would you do first, second etc....).
- Follow-up plans (How are you going to that that what you have implemented is working or if you need to modify your plan?).

To get you started following here are some ideas that past students have used or thought about using:

- Write this up as a newsletter or news paper article telling the reader your plans,
- Use something PowerPoint and think of it as a presentation to a school and/or parents;
- Use a graphics program to show plan as a concept map or flow chart
- Use HyperStudio with links and buttons

- Take an existing lesson plan or unit and annotate it to demonstrate your plan

This is a time for you to integrate all the resources you have available, things such as: What you have learned about adolescent development; Learning styles; Your special education inclusion course; Course discussions; The film "How difficult can this be?"; Class materials/resources; Your cooperating teacher and other school resources.

Action Plan – Gender

It is easy to say that teachers should be fair to all students. It can be difficult to see small subtle things in classroom assignments; textbooks how we structure a lesson and even room arrangements that limit some students access to information. We have watched and discussed the film "Failing at Fairness." We have looked at textbooks and analyzed them for content and the graphics used. In previous classes you were asked to keep track of which students your cooperating teacher called on and what kinds of questions each student was asked. A very limited amount of time in previous coursework has been spent dealing with the dilemmas that homosexual adolescents face in a school environment. Each of these activities have helped build your background knowledge and helped you build skills for identifying subtle and not so subtle ways that women and men are treated in a classroom. Knowing all of this what things can you do in your lessons and as you plan your classroom to ensure that all students have access to the best type of learning environment for them?

Action Plan –Diversity

Similar to concerns that teachers have about issues of gender, issues of diversity are often subtle. Diversity can also take on a lot of different meanings depending on the context. Choose two categories from the following list or propose one or two of your own and develop an action plan that outlines how you are going to support students. For each category choose a minimum of two areas to address. This plan will be similar to the one developed for "Learning Styles."

- Culture (Middle East, Hispanic, Asian, Native American, etc.)
- Socioeconomic (lower income, homeless, urban, rural, migrant, etc.…)
- Religious (Islamic, Judaism, Fundamental Christian, etc.)
- Other category or categories of your choosing (See me for approval)

Action Plan – Classroom Management

Regardless of how wonderful a teacher you may be or plan on being, or how busy or engaged you plan on having your students being, it is necessary to plan and establish some basic class rules and to have a plan in place for when a student breaks one or more of those rules. This action plan is your opportunity to think through how are you going to organize you class, arrange your classroom, and hold students accountable for their actions. This action plan differs slightly from some of the

other action plans that you have developed for this course. For classroom management your action plans should include the following sections.

- Classroom map or diagram of your ideal classroom
- Class rules (including consequences if students break rules)
- Lab rules (including consequences if students break rules)
- Homework and make-up work policy
- List of individuals or categories of individuals you plan on es move from student to teacher. 1colleagues, counselors, social workers, administrators, etc....) and what role you hope they will play.
- List of print or media resources that you can use additional support (i.e. Cantor, Slavin, Glasser, etc.)

Action Plan – Professional/ Life long learning

Once you leave the university and have full time teaching responsibilities it can be difficult to keep up on the changing and growing science disciplines and in the new education research. In class you have learned about the National Science Teachers Association, and other professional organizations, we have discussed and some of you have had a chance to attend some professional meetings. This action plan is designed to help you make a commitment to continued professional/life long learning. Using the following list as a starting point, identify 5 things that you plan on doing within the next year to support and build your understanding of science and teaching. Once you have identified these 5 areas also provide contact information for the organization or resource and establish a time frame for starting each activity.

- Teaching organization and related journals (you could list these as individual actions for example: Joining NSTA and joining the National Biology Teachers Association and receiving their journals could be two of your five activities.
- Science organizations and related journals (see above)
- WWW resources (spell out schedule for looking for resources and incorporating this into your classroom)
- Attendance at professional meetings (which meetings, how often)
- Presenting at professional meetings (which meetings, how often)
- Cooperative Learning
- Science Inquiry (topics, schedule, resources)
- Environmental Science
- Using technology to teach science
- Using community resources
- Write a grant to get additional resources for your classroom/school
- Graduate work

Appendix B: Sample Action Plans

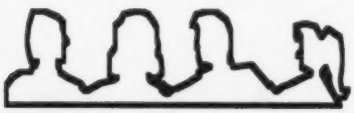
Student Names have been changed.

Diversity – Kelly 1998
Learning Styles – Lee 1996
Gender – Angie 1997

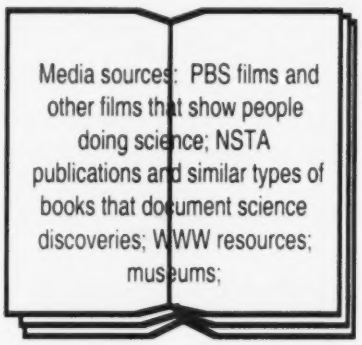
*Note-- assignment and rubric has evolved so all aspects of revised assignments and rubrics may not be present in these examples.

Diversity Action Plan

Schools are a miniversion of the rest of society. Therefore, each school and each classroom will have students from a wide variety of cultural backgrounds. Teachers need to be sensitive to the diverse backgrounds that students come from, these differences need to be celebrated and used in teaching not ignored. Science is and has always been multicultural, driven by changing society and various religious beliefs. Science becomes more relevant for students when this is part of the a science classroom.



people resources: students, parents, other teachers, community members, cultural groups, museum folks, folklorists, university faculty


Media sources: PBS films and other films that show people doing science; NSTA publications and similar types of books that document science discoveries; WWW resources; museums;

Use extra material when teaching that show the contributions of other cultures and the role of society and religion on the history of science

Identify main topics in unit

Identify cultures and religions represented in school and classroom

Include this in class presentation -- supplimenting text

Research historical background -- looking speficially for contributions of multiple cultures

Ask students to do library or internet research for some topics -- doesn't have to always come from teacher

When choosing texts make sure that it doesn't just focus on white-european science

Show how science is part of everyday life and how people around the world add to science knowledge

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